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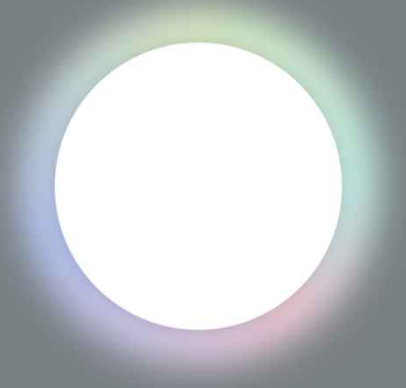
An Ecosystem of Wireless Power

Feb 5th 2020



Wireless Power at a Distance: Nothing Like It

- Create a truly unplugged world
- Wireless power anywhere and anytime
- Always-on power, or charge in background
- Smaller battery or battery-less devices

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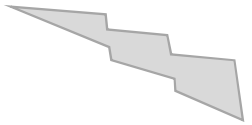
GuRu's proprietary *RF Lensing* Technology



Power transfer through **focused millimeter wave** beams

Multiple watts over **multiple meters** to **multiple devices**

Dynamically finds devices and focuses the energy on them

Fundamentally different physics from contact wireless charging (Qi)

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GuRu's current systems

- Guru's products: Room system, desk system, mobile (roving) system

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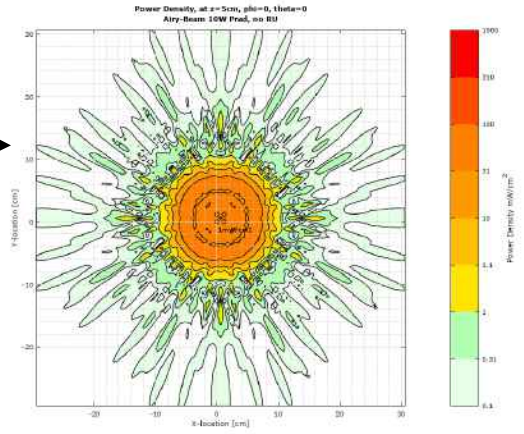
RF Lensing – How it works?

Transmitter

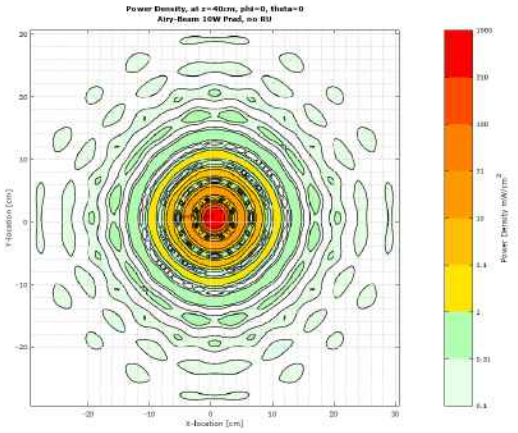
Tx

Localized, conical beam (power confinement)

Power at receiver localized and absorbed (used)



Simulated power density close to transmit aperture



Simulated power density at receiver

- RF energy can be **confined** in conical mm-wave beam
- RF energy is absorbed (used) at the receiver

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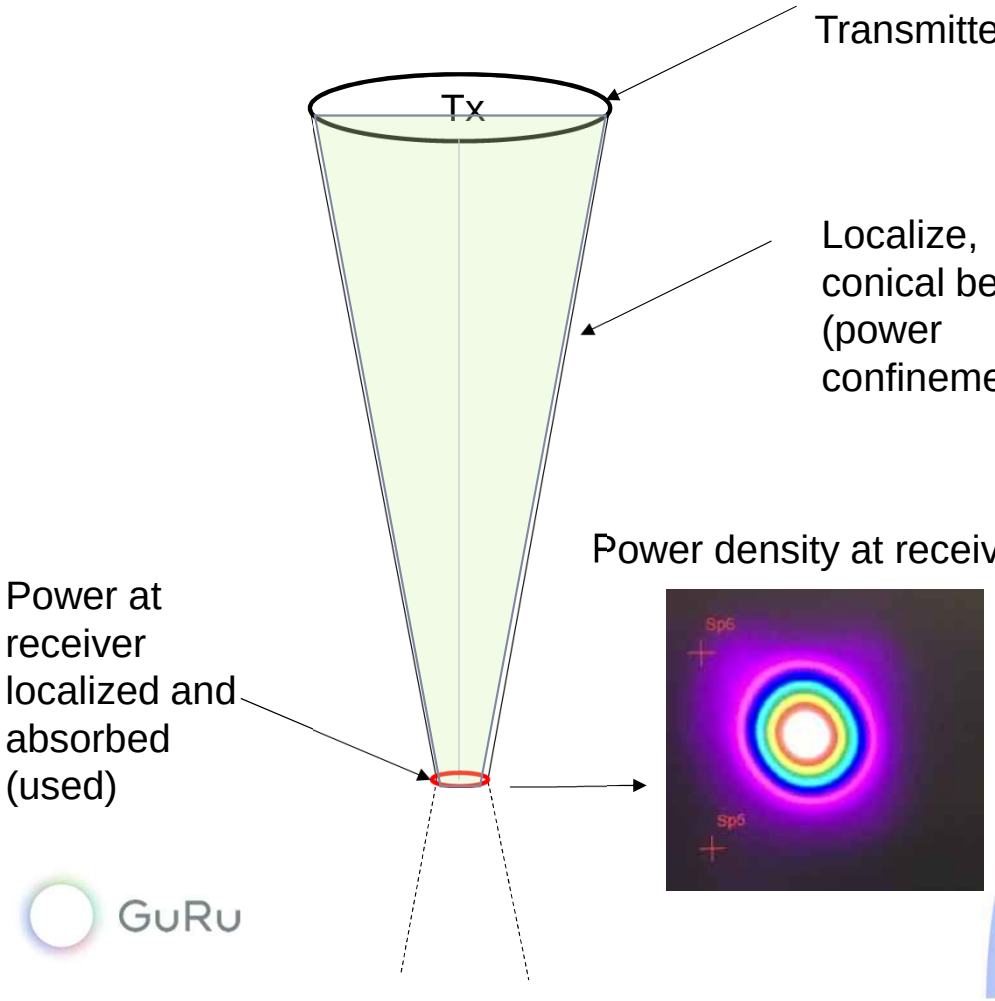
RF Lensing – What it means



- Localization means **safety**
  - Very little RF energy is transmitted elsewhere
- Localization also results in higher **transfer efficiency** (next slide)

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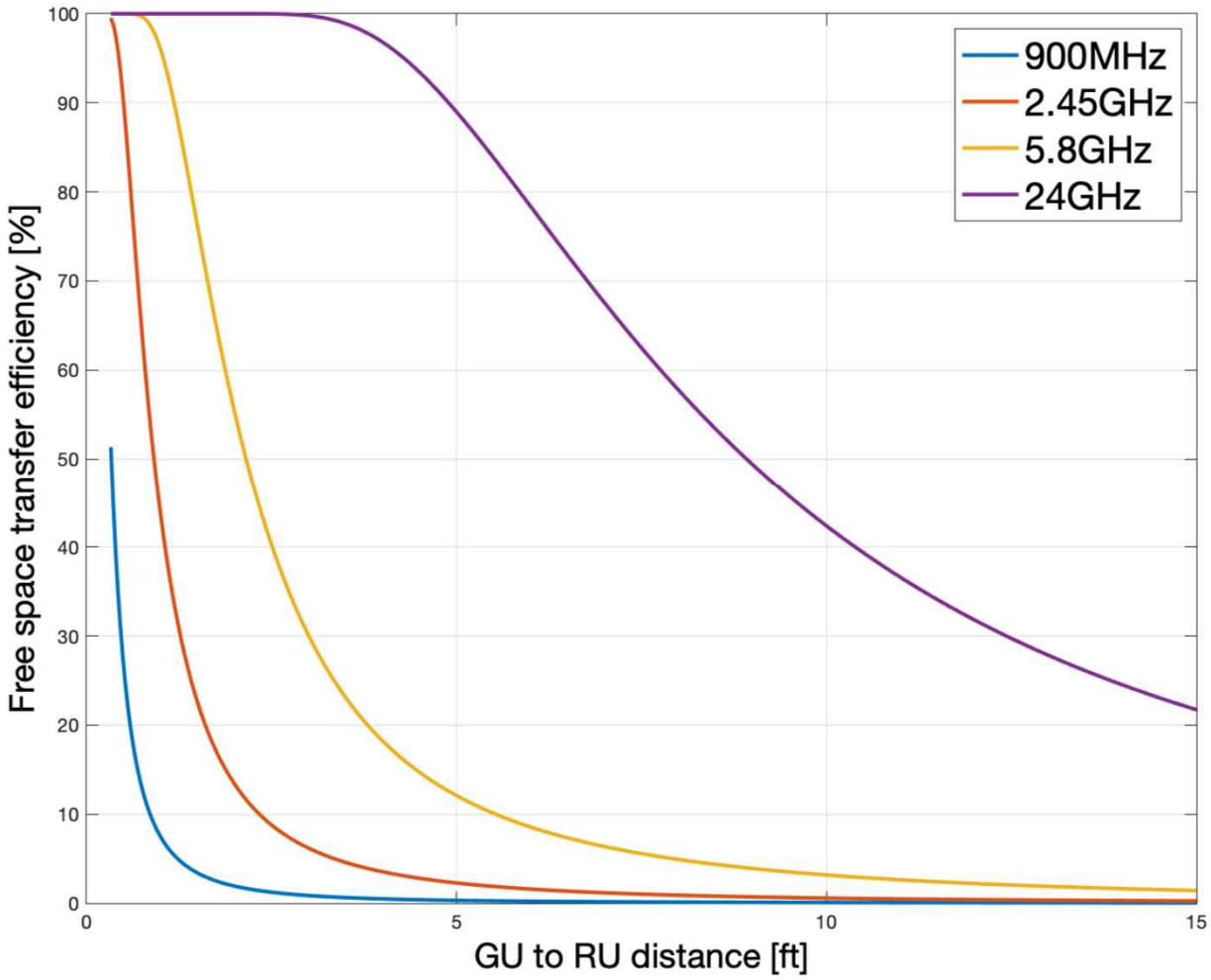
Free-Space Transfer Efficiency (Example)

- Assumptions:
  - TX (GU) size : 40cm x 40cm
  - RX (RU) size : 5cm x 10cm
- Efficiency limited by ***Diffraction***
- Shown are best-case scenarios without use of concave (focusing) mirrors or dielectric lenses



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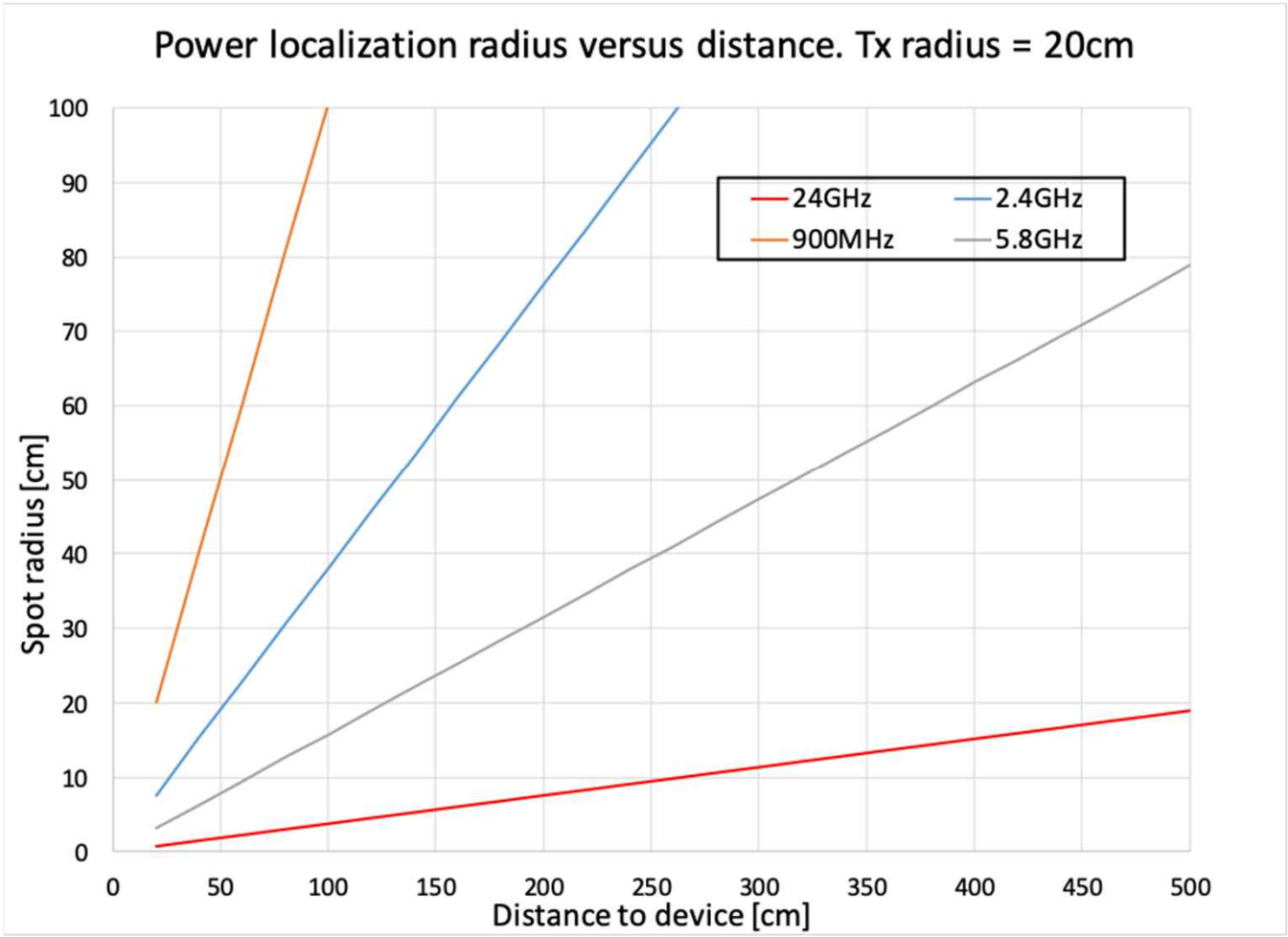
Power spot size versus distance for different operating frequencies



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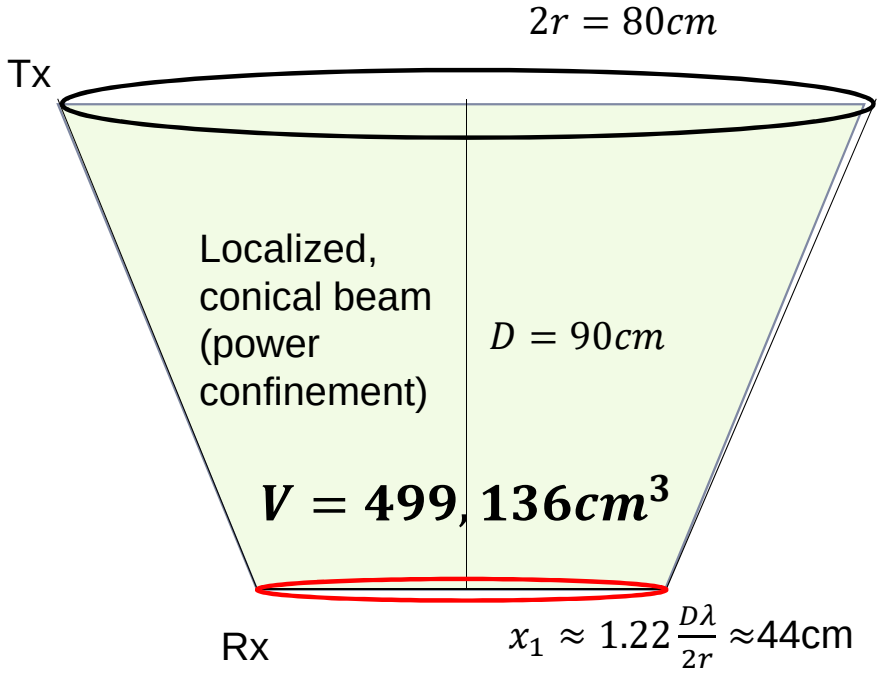
Volumetric Confinement of RF power

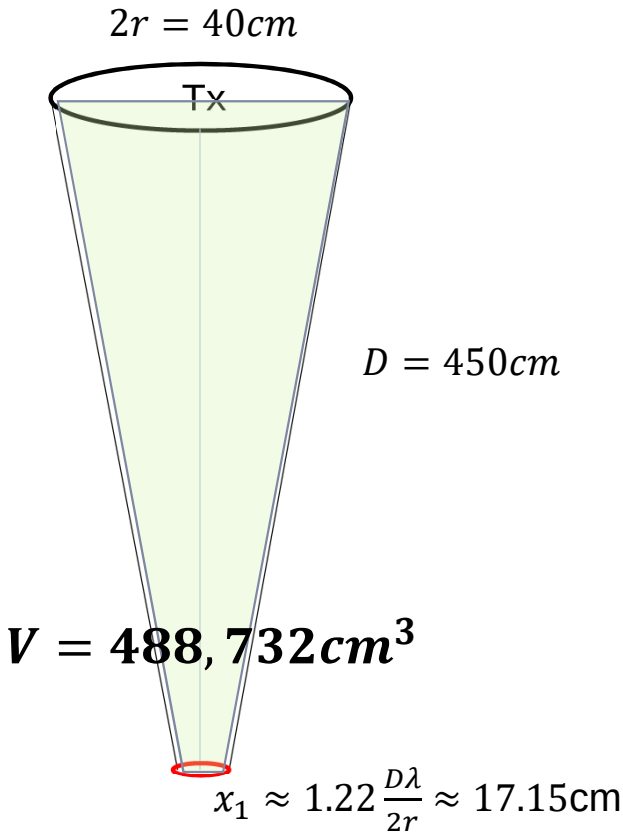
- Compare two systems:



916MHz

$\lambda = 33cm$

$$V = \frac{1}{3}\pi D(x_1^2 + r^2 + x_1 r)$$



24GHz

$\lambda = 1.25cm$

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End of Slideshow